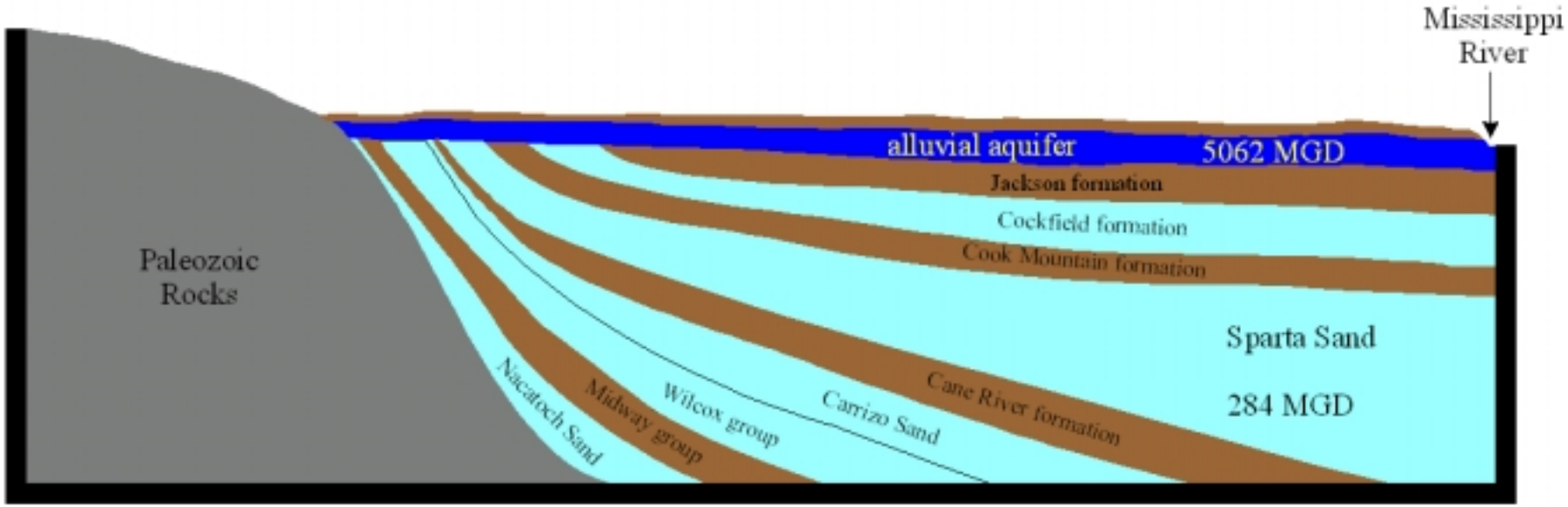
Generalized Geology of Eastern Arkansas



Modified from USGS Water Supply Paper 2275

SPARTA AQUIFER

Statewide (81 percent increase)

1985 Water Use	157 mgd
1995 Water Use	284 mgd

Arkansas County (38 percent increase)

1985 Water Use	37 mgd
1995 Water Use	51 mgd

Fig. 16

Water Level Changes of the Sparta/Memphis Aquifer, 1999 - 2000

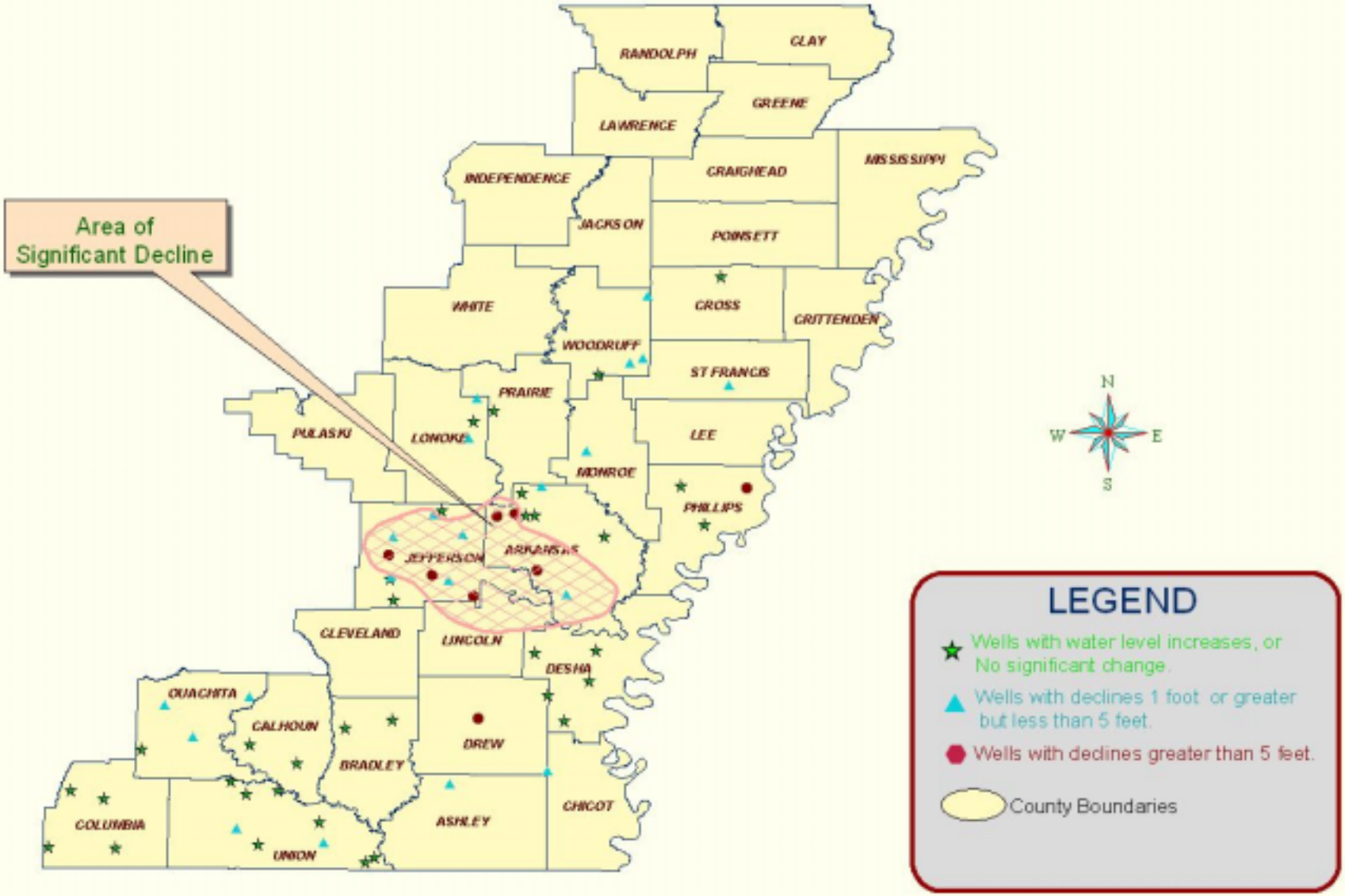


Fig. 19

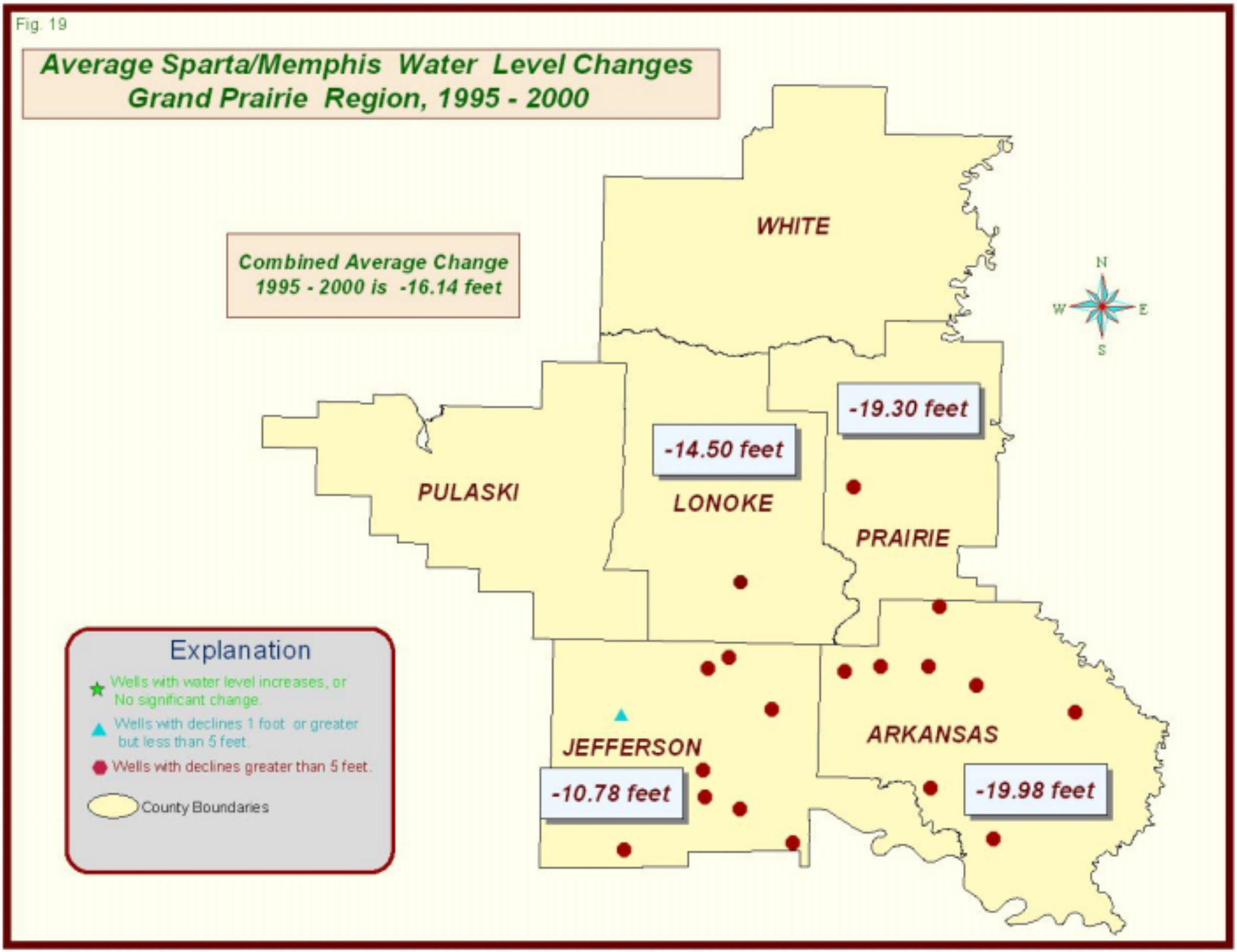
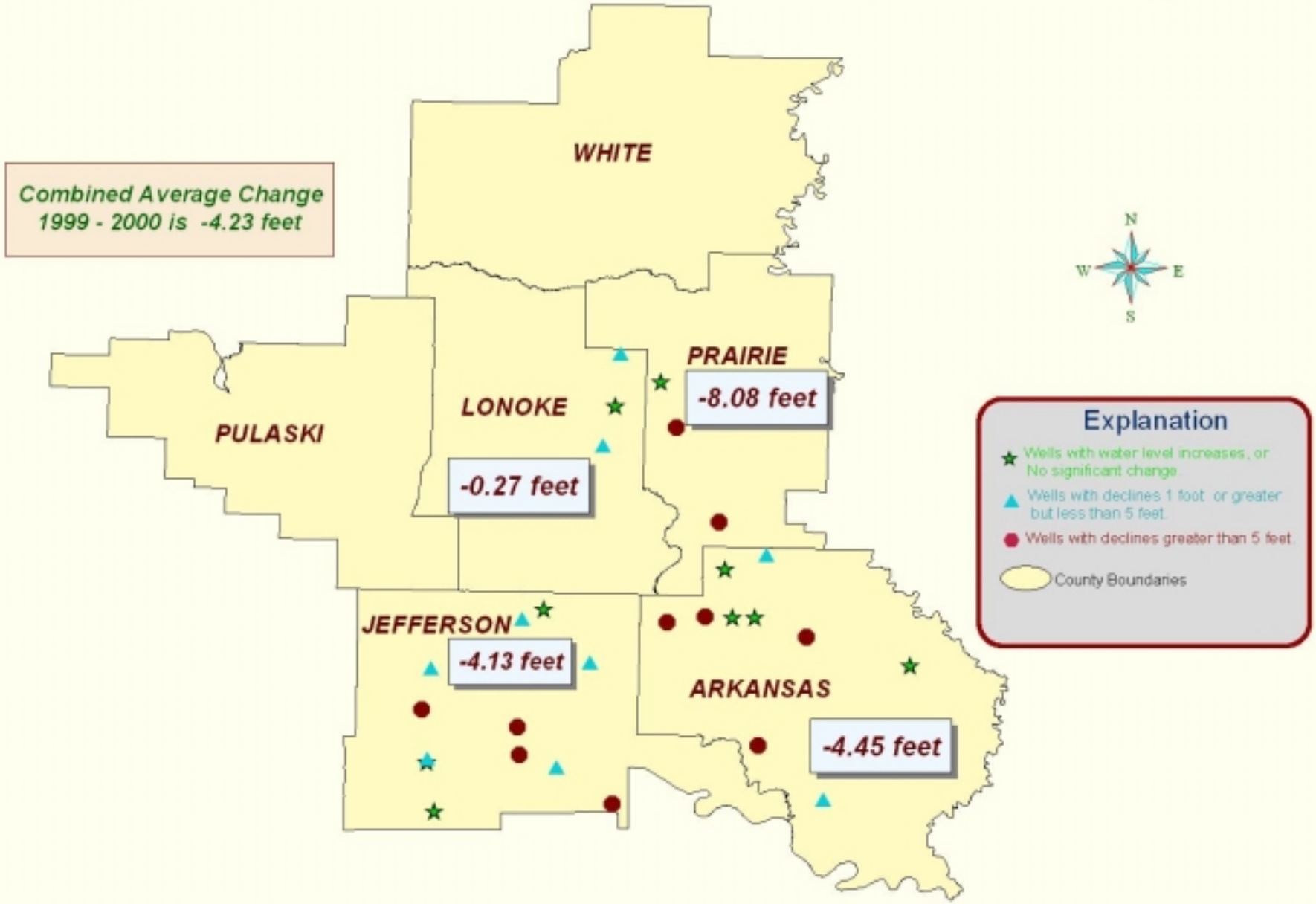
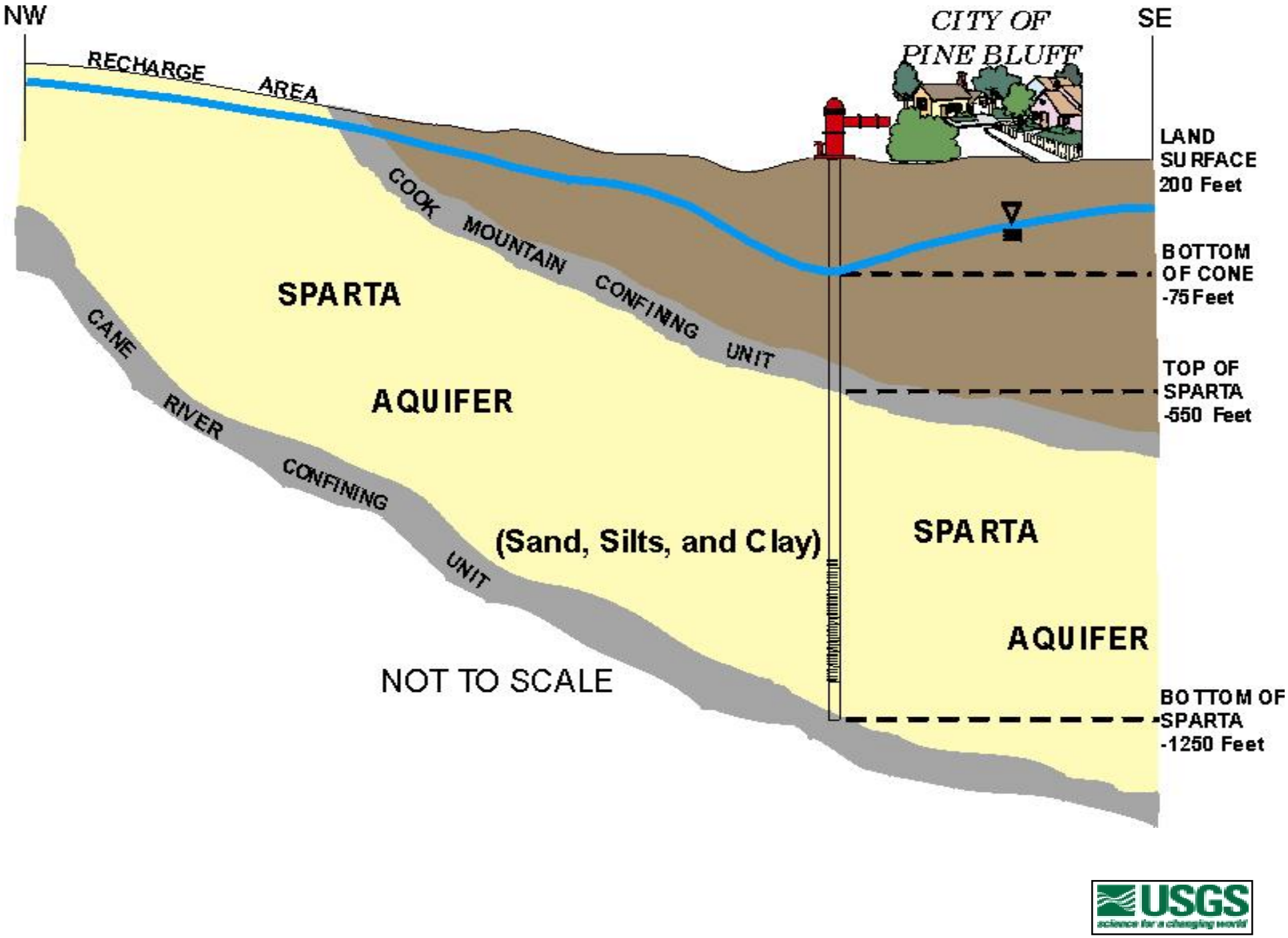

Average Sparta/Memphis Water Level Changes
Grand Prairie Region, 1995 - 2000
Combined Average Change
1995 - 2000 is -16.14 feet
WHITE
PULASKI
LONOKE
PRAIRIE
JEFFERSON
ARKANSAS
-14.50 feet
-19.30 feet
-10.78 feet
-19.98 feet
N
W
E
S
Explanation
Wells with water level increases, or No significant change.
Wells with declines 1 foot or greater but less than 5 feet.
Wells with declines greater than 5 feet.
County Boundaries

Fig. 20

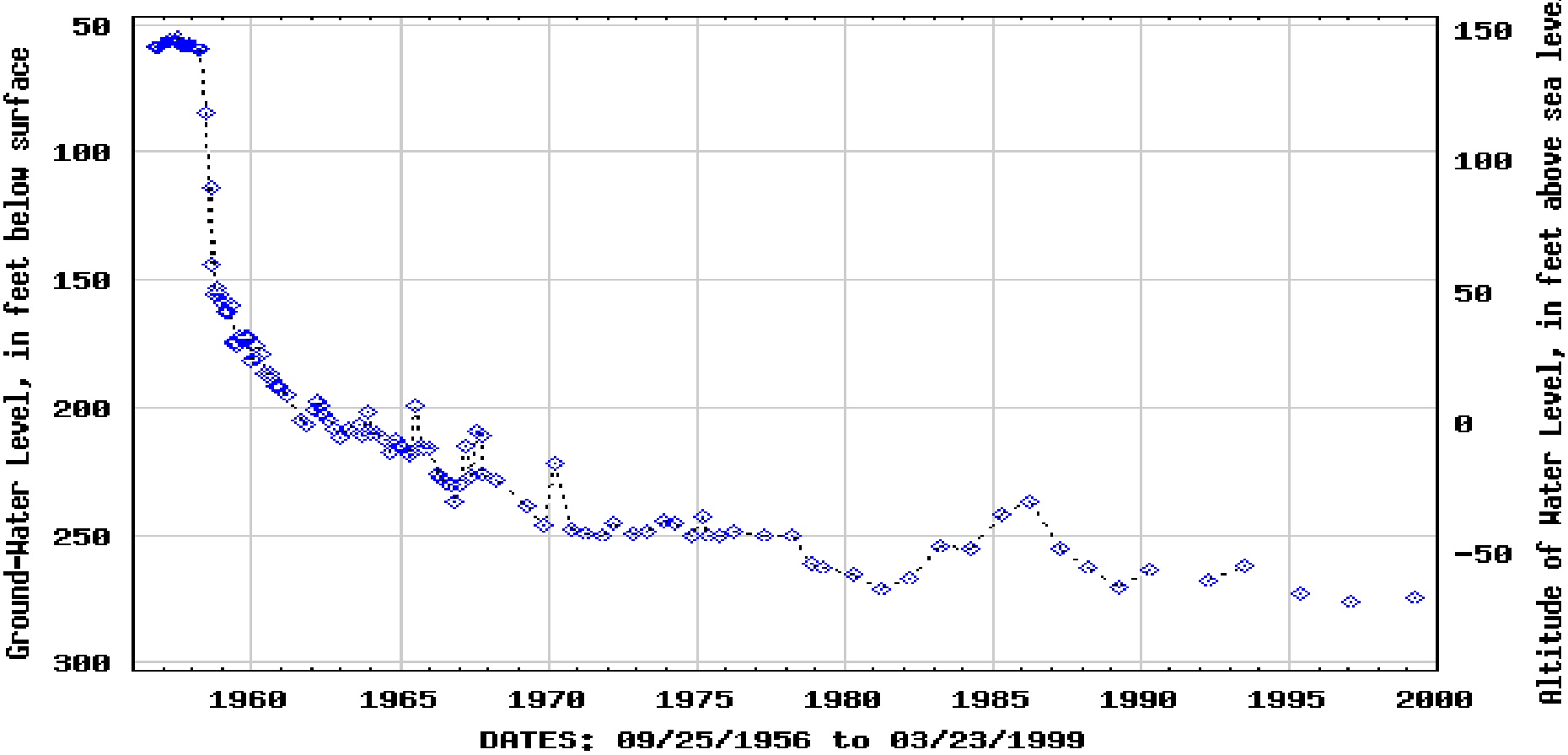
Average Sparta/Memphis Water Level Changes
Grand Prairie Region, 1999 - 2000




NW
SE
CITY OF PINE BLUFF
RECHARGE AREA
COOK MOUNTAIN CONFINING UNIT
SPARTA AQUIFER
CANE RIVER CONFINING UNIT
(Sand, Silts, and Clay)
SPARTA AQUIFER
NOT TO SCALE
LAND SURFACE 200 Feet
BOTTOM OF CONE -75 Feet
TOP OF SPARTA -550 Feet
BOTTOM OF SPARTA -1250 Feet

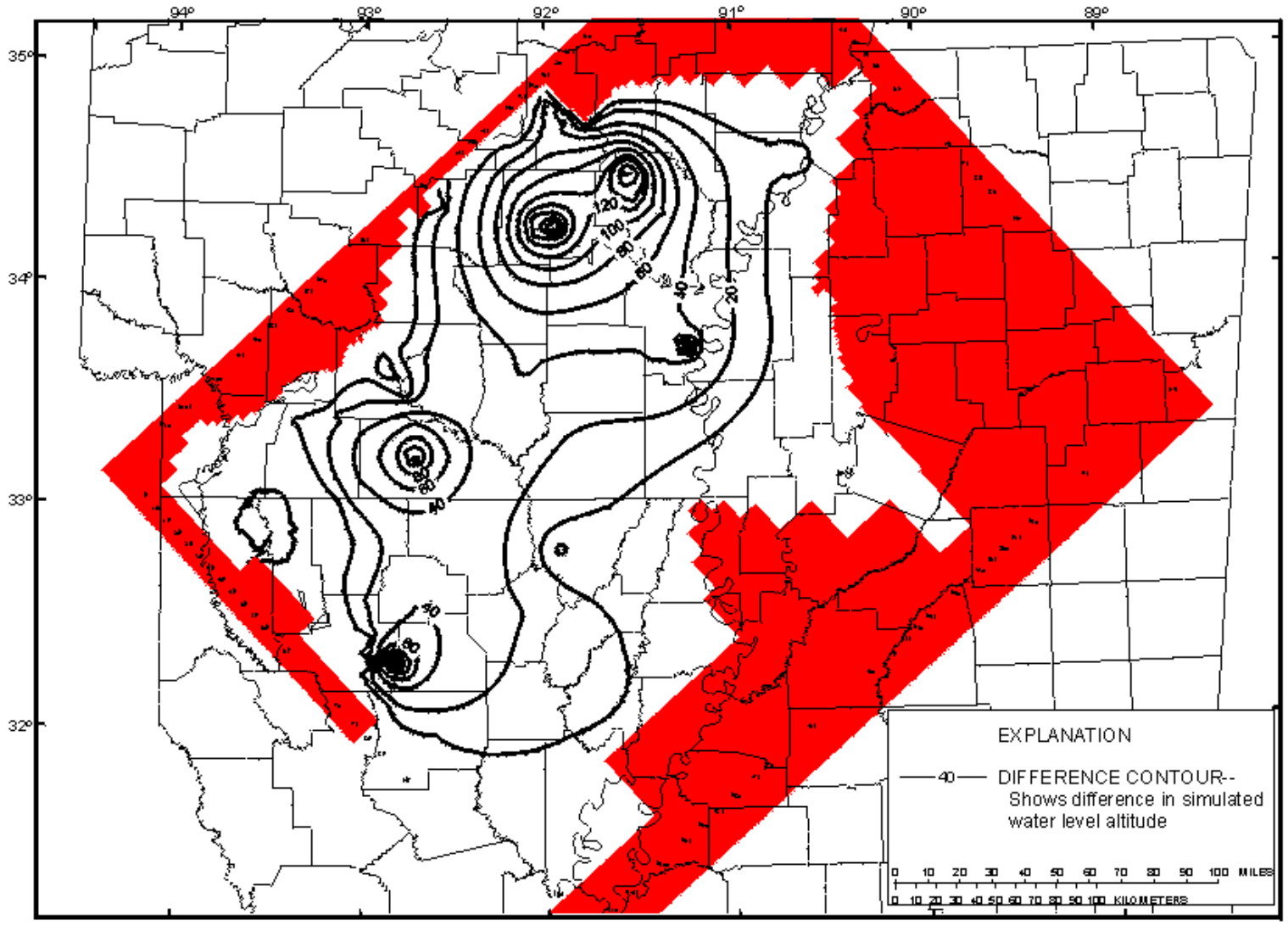
USGS

USGS 341427091565201 05S09W35AAB1



Provisional Data Subject to Revision

USGS science for a changing world



CONTOURED DIFFERENCE IN STARTING AND FINAL (1997-2027)
WATER LEVEL DISTRIBUTION FOR SCENARIO 2

Scenario #2 Results

(Change based upon water-use trends)

- Large declines occur throughout much of the Sparta in Arkansas
- Water levels decline about 130 ft at El Dorado and about 220 ft at Pine Bluff
- Water levels decline about 25 ft throughout much of the Sparta in Louisiana; the largest decline (-125 ft) occurs near Jonesboro

USGS
science for a changing world

Comparison of Sparta and alluvial aquifers

- Alluvial aquifer specific yield to wells per 1 mile sq. x 1 ft.
- 192 acre-feet (Sy=.3)
- T= 30,000 to 45,000
- feet sq./day

- Sparta aquifer storage yield to wells per 1 mile sq. x 1 ft.
- .06 acre-ft. (S=.0001)
- 6 acre-ft. (Sy=.01)
- T= 4,000 to 17,000
- feet sq./day

SPARTA AQUIFER

Water Use has increased **27.4%:**

1990: **222.50** Mgd 1995: **283.52** Mgd

Average Change

from 1990 to 1997: **-4.6** feet

Number of Wells Monitored in 1997: **300**

Number of Wells with Declines:

90 to 97: **119** 95 to 97: **84**

Average of Declines:

90 to 97: **-6.28** feet 95 to 97: **-2.42** feet

GRAND PRAIRIE REGION

SPARTA AQUIFER DATA

Sparta Water Use increased **30 %**

1990: 172.9 Mgd 1995: **224.8** Mgd

Average Change from 1990 to 1997: **-8.72** feet

Number of Wells Monitored in 1997: **106**

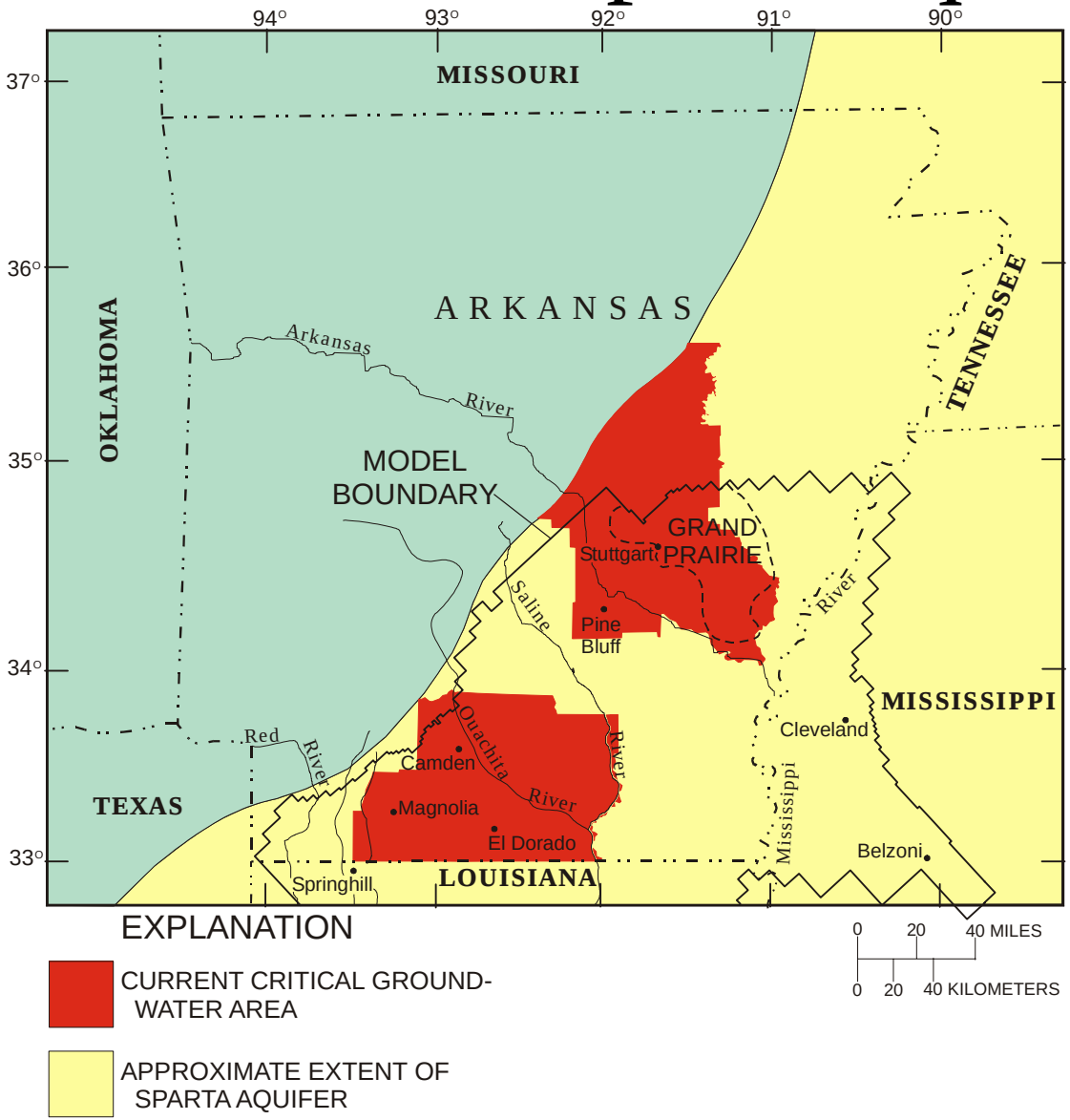
Number of Wells with Declines:

90 to 97: **49 (56)** 95 to 97: **36**

Average of Declines:

90 to 97: **-8.42** feet 95 to 97: **-4.22** feet

Extent of the Sparta aquifer



Sparta aquifer hydrologic status

- Sparta water use and water-level declines have accelerated in Arkansas County in recent years
- Model results show that large cones of depression will continue to develop with the current rate of growth of water use
- The Sparta aquifer does not have the storage to support the volumes needed for agricultural use for the long term

Sparta aquifer hydrogeologic characteristics, cont.

- Storage—approx. specific storage = $6x10^{-7}$/ft
  1 ft^2 of aquifer yields 0.0000006 ft^3 of water during a 1-ft water-level decline
- Hydraulic conductivity—generally ranging from 10 – 200 ft/day, averaging about 70 ft/day
- Yields—generally ranging 100 - 500 gpm